

CLAIMS

1. A method of polarimetry by allowing a light with a known polarization direction "X" to be incident upon a sample, detecting a polarization direction of a light transmitted through said sample, and measuring an angle of rotation of a polarization direction in said sample on the basis of the difference between said polarization directions of said incident light and said transmitted light, said method further comprising the steps of:

changing and modulating said polarization direction "X" of said incident light;

detecting only a polarized component in a specific direction out of said light transmitted through said sample by a photosensor to obtain an output signal;

performing a phase sensitive detection on said output signal by using a signal for said modulating as a reference signal to obtain a demodulation signal "Y";

calculating an angle of rotation from 3 or more measuring points "Pi" (X_i , Y_i) obtained from 3 or more polarization signals "Xi", where i denotes an integer of from 1 to n, where n denotes 3 or more, discretely selected from said polarization direction "X", and 3 or more demodulation signals "Yi", where i denotes an integer of from 1 to n and n denotes 3 or more, respectively corresponding to said polarization signals X_i ; and

measuring repeatedly at least one measuring point

"Pi" out of said 3 or more measuring points "Pi" (Xi, Yi) when said calculated angle of rotation is judged not effective, to calculate again said angle of rotation on the basis of said measuring point "Pi" (Xi, Yi) measured repeatedly, and repeating said measurement until said angle of rotation is judged effective.

2. The method of polarimetry in accordance with claim 1, wherein when the number of said repeated measurement exceeds a prescribed number, said measurement action is stopped to stop said polarimetry for said sample.

3. The method of polarimetry in accordance with claim 1, wherein at least one measuring point "Pj" (Xj, Yj), where $X_j \neq X_i$, other than said 3 or more measuring points "Pi" (Xi, Yi) is measured in said repeated measurement.

4. The method of polarimetry in accordance with claim 1, wherein said polarization direction "X" of said incident light is discretely changed into 3 or more polarization signals "Xi".

5. The method of polarimetry in accordance with claim 1, wherein said 3 or more measuring points "Pi" (Xi, Yi) are subjected to a linear regression treatment by using said "Xi" as criterion variables and said "Yi" as dependent variables on the basis of the principle of a least squares method to calculate a regression line represented by the equation (1):

$$Y = A + B \times X \quad (1)$$

where "Y" denotes a variable indicating said demodulation signal, "A" denotes a constant calculated, "B" denotes another constant calculated, and "X" denotes a variable indicating said polarization direction, and

"X" is calculated from "A", "B" and a prescribed "Y" of said regression line to calculate said angle of rotation attributed to said sample on the basis of said "X".

6. The method of polarimetry in accordance with claim 5, wherein said calculated angle of rotation is judged effective when said "A" is not less than a prescribed minimum value or not more than a prescribed maximum value.

7. The method of polarimetry in accordance with claim 6, wherein said prescribed maximum value of said "A" is one calculated when a sample having a maximum transmittance is measured out of samples to be measured.

8. The method of polarimetry in accordance with claim 6, wherein the reliability of said calculated angle of rotation is evaluated on the basis of the fit between said measuring points "Pi" and said regression line.

9. A method of polarimetry by applying a magnetic field to a sample containing a spontaneously optical active substance and a magneto-optical active substance, allowing a light with a known polarization direction "X" to be incident upon said sample, changing and modulating a polarization direction of a light transmitted through said sample, and calculating an angle of rotation attributed to said sample on

the basis of a magnitude of said magnetic field when an amount of change in an angle of rotation attributed to said spontaneously optical active substance and an amount of change in an angle of rotation attributed to said magnetic field satisfy a prescribed relation, said method comprising the steps of:

changing and modulating said polarization direction "X" of said incident light by applying said magnetic field;

detecting only a polarized component in a specific direction out of said light transmitted through said sample by a photosensor to obtain an output signal;

performing a phase sensitive detection on said output signal by using a signal for said modulating as a reference signal to obtain a demodulation signal "Y";

calculating an angle of rotation from 3 or more measuring points " P_i " (X_i , Y_i) obtained from said magnetic field strengths " X_i ", where i denotes an integer of from 1 to n and n denotes 3 or more, corresponding to 3 or more polarization signals discretely selected from said polarization direction "X", and 3 or more demodulation signals " Y_i ", where i denotes an integer of from 1 to n and n denotes 3 or more, respectively corresponding to said magnetic field strengths " X_i "; and

measuring repeatedly at least one measuring point " P_i " out of said 3 or more measuring points " P_i " (X_i , Y_i) when said calculated angle of rotation is judged not effective, to

calculate again said angle of rotation on the basis of said measuring point "Pi" (Xi, Yi) measured repeatedly, and repeating said measurement until said angle of rotation is judged effective.

10. The method of polarimetry in accordance with claim 9, wherein when the number of said repeated measurement exceeds a prescribed number, said measurement action is stopped to stop said polarimetry for said sample.

11. The method of polarimetry in accordance with claim 9, wherein at least one measuring point "Pj" (Xj, Yj), where $X_j \neq X_i$, other than said 3 or more measuring points "Pi" (Xi, Yi) is measured in said repeated measurement.

12. The method of polarimetry in accordance with claim 9, wherein said magnetic field strength is discretely changed into 3 or more magnetic field strengths.

13. The method of polarimetry in accordance with claim 9, wherein said 3 or more measuring points "Pi" (Xi, Yi) are subjected to a linear regression treatment by using said "Xi" as criterion variables and said "Yi" as dependent variables on the basis of the principle of a least squares method to calculate a regression line represented by the equation (1):

$$Y = A + B \times X \quad (1)$$

where "Y" denotes a variable indicating said demodulation signal, "A" denotes a constant calculated, "B" denotes another constant calculated, and "X" denotes a variable indicating

said polarization direction, and

"X" is calculated from "A", "B" and a prescribed "Y" of said regression line to calculate said angle of rotation attributed to said sample on the basis of said "X".

14. The method of polarimetry in accordance with claim 13, wherein said calculated angle of rotation is judged effective when said "A" is not less than a prescribed minimum value or not more than a prescribed maximum value.

15. The method of polarimetry in accordance with claim 14, wherein said prescribed maximum value of said "A" is one calculated when a sample having a maximum transmittance is measured out of samples to be measured.

16. The method of polarimetry in accordance with claim 14, wherein the reliability of said calculated angle of rotation is evaluated on the basis of the fit between said measuring points "Pi" and said regression line.

17. A method of polarimetry by allowing a light with a known polarization direction "X" to be incident upon a sample, detecting a polarization direction of a light transmitted through said sample, and measuring an angle of rotation of a polarization direction in said sample on the basis of the difference between said polarization directions of said incident light and said transmitted light, said method comprising the steps of:

changing and modulating said polarization direction "X" of said incident light;

detecting only a polarized component in a specific direction out of said light transmitted through said sample by a photosensor to obtain an output signal;

performing a phase sensitive detection on said output signal by using a signal for said modulating as a reference signal to obtain a demodulation signal "Y"; and

calculating an angle of rotation from two measuring points "Pi" (X_i , Y_i) obtained from two polarization signals " X_i ", where i denotes 1 and 2, discretely selected from said polarization direction "X", and two demodulation signals " Y_i ", where i denotes 1 and 2, respectively corresponding to said polarization signals X_i .

18. The method of polarimetry in accordance with claim 17, wherein at least one measuring point "Pi" out of said two measuring points "Pi" (X_i , Y_i) is measured repeatedly when said calculated angle of rotation is judged not effective, to calculate again said angle of rotation on the basis of said measuring point "Pi" (X_i , Y_i) measured repeatedly, and said measurement is repeated until said angle of rotation is judged effective.

19. The method of polarimetry in accordance with claim 18, wherein when the number of said repeated measurement exceeds a prescribed number, said measurement action is stopped to stop said polarimetry for said sample.

20. The method of polarimetry in accordance with claim 18, wherein at least one measuring point " P_j " (X_j , Y_j),

where $X_j \neq X_i$, other than said two measuring points "Pi" (X_i , Y_i) is measured in said repeated measurement.

21. The method of polarimetry in accordance with claim 17, wherein said polarization direction "X" of said incident light is discretely changed into two polarization signals "Xi".

22. The method of polarimetry in accordance with claim 17, wherein a line connecting said two measuring points "P1" (X_1 , Y_1) and "P2" (X_2 , Y_2) is calculated on the basis of the equation (5):

$$Y = E + F \times X \quad (5)$$

where "Y" denotes a variable indicating said demodulation signal, "E" denotes a constant calculated, "F" denotes another constant calculated and "X" denotes a variable indicating said polarization direction, "X" is calculated from "E", "F" and a prescribed "Y" of said line to calculate said angle of rotation attributed to said sample on the basis of said "X".

23. The method of polarimetry in accordance with claim 22, wherein said calculated angle of rotation is judged effective when said "E" is not less than a prescribed minimum value or not more than a prescribed maximum value.

24. The method of polarimetry in accordance with claim 23, wherein said prescribed maximum value of said "E" is one calculated when a sample having a maximum transmittance is measured out of samples to be measured.

25. A method of polarimetry by applying a magnetic

2025 RELEASE UNDER E.O. 14176

field to a sample containing a spontaneously optical active substance and a magneto-optical active substance, allowing a light with a known polarization direction "X" to be incident upon said sample, changing and modulating s polarization direction of a light transmitted through said sample, and calculating an angle of rotation attributed to said sample on the basis of a magnitude of said magnetic field when an amount of change in an angle of rotation attributed to said spontaneously optical active substance and an amount of change in an angle of rotation attributed to said magnetic field satisfy a prescribed relation, said method comprising the steps of:

changing and modulating said polarization direction "X" of said incident light by applying said magnetic field;

detecting only a polarized component in a specific direction out of said light transmitted through said sample by a photosensor to obtain an output signal;

performing a phase sensitive detection on said output signal by using a signal for said modulating as a reference signal to obtain a demodulation signal "Y"; and

calculating an angle of rotation from two measuring points "Pi" (X_i , Y_i) obtained from said magnetic field strengths " X_i ", where i denotes 1 and 2, corresponding to two polarization signals discretely selected from said polarization direction "X", and two demodulation signals " Y_i ", where i denotes 1 and 2, respectively corresponding to said

2025 RELEASE UNDER E.O. 14176

magnetic field strengths "Xi".

26. The method of polarimetry in accordance with claim 25, wherein at least one measuring point "Pi" out of said two measuring points "Pi" (Xi, Yi) is measured repeatedly when said calculated angle of rotation is judged not effective, to calculate again said angle of rotation on the basis of said measuring point "Pi" (Xi, Yi) measured repeatedly, and said measurement is repeated until said angle of rotation is judged effective.

27. The method of polarimetry in accordance with claim 26, wherein when the number of said repeated measurement exceeds a prescribed number, said measurement action is stopped to stop said polarimetry for said sample.

28. The method of polarimetry in accordance with claim 26, wherein at least one measuring point "Pj" (Xj, Yj), where $X_j \neq X_i$, other than said two measuring points "Pi" (Xi, Yi) is measured in said repeated measurement.

29. The method of polarimetry in accordance with claim 25, wherein said magnetic field strength is discretely changed into two magnetic field strengths.

30. The method of polarimetry in accordance with claim 25, wherein a line connecting said two measuring points "P1" (X1, Y1) and "P2" (X2, Y2) is calculated on the basis of the equation (5):

$$Y = E + F \times X \quad (5)$$

where "Y" denotes a variable indicating said demodulation

signal, "E" denotes a constant calculated, "F" denotes another constant calculated and "X" denotes a variable indicating the polarization direction), and

"X" is calculated from "E", "F" and a prescribed "Y" of said line to calculate said angle of rotation attributed to said sample on the basis of said "X".

31. The method of polarimetry in accordance with claim 30, wherein said calculated angle of rotation is judged effective when said "E" is not less than a prescribed minimum value or not more than a prescribed maximum value.

32. The method of polarimetry in accordance with claim 31, wherein said prescribed maximum value of said "E" is one calculated when a sample having a maximum transmittance is measured out of samples to be measured.